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Original article

Knowledge and practice of infection control of dental impressions among dental technicians in Tripoli, Libya

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ABSTRACT

Background and objectives. *Cross infection among prosthodontologist and dental lab technicians is very important issue, especially after several studies found that transmission of infection to dental lab technicians is mainly by contaminated impressions or by improper handling of clinical items after arrival at the Dental laboratory. Dental impressions can be cross-contaminated by patient's saliva and blood, which then cross-infect the dental casts poured from the impressions. The present study was carried out to evaluate the knowledge and the practice of infection control of dental impressions among dental technicians in Tripoli, Libya.* ***Methods***. *This study was based on questionnaire that designed to cover different aspects of cross-infection control in the dental clinic. The questionnaire consists of 10 closed end question and 3 yes, no question.* ***Results***. *The response rate was 85%. The questionnaire showed that almost 32.9% of the dental technicians did not have instructions related to disinfection in the dental lab. Upon receipt of dental impressions, the majority (80.5%) reported always rinsing them with water only. Moreover, about 7.8% of the dental technicians reported never disinfecting dental impressions and about 16.9% reported that they sometimes disinfected impressions. In the labs were the disinfection applied, 12% of the dental labs used spray disinfection (without water) and also 12% of dental technicians used immersion disinfection (without water).* ***Conclusion***. *The findings of this study show that practices and awareness of dental technicians regarding infection control are less than ideal, moreover there is lack of communication between dentists and dental technicians so should increase awareness and establishing educational programs for both dentists and dental technicians to decrease the risk of transmission of diseases in dental laboratories.*

Keywords: Infection Control, Dental Impressions, Knowledge, Practice, Dental Technicians.

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INTRODUCTION

The dental clinic is an environment where disease transmission occurs easily [1].

The dental staff are exposed to various risk factors that can lead to the diseases that are transmissible through various types of fluid, especially hepatitis B and HIV that are considered major public health problems In the dental clinic transmission of infection may occur through multiple routes, such as direct transmission through contact with infected blood, oral fluids, or other bodily secretions; indirect transmission through contact with contaminated instruments, materials, or environmental surfaces; or through inhalation of

airborne contaminants present in splattered droplets or aerosols of oral and respiratory fluids [2,3].

Patients, dentists and auxiliaries of all groups run risks every time they enter the dental clinic. Wearing of gloves and face mask by dental personnel has been advised as an essential element of cross-infection control in the dental clinic. Prosthodontics' Clinic required a high degree of concern regarding cross infection through patients, personnel, unsterilized instruments and equipment. Prosthodontics treatment is coordinating work between clinic and lab as the prosthodontist work should be supplemented by the lab one, and hence the chance of cross infection is increase especially in case of miscommunication between them. For instance, impression materials that have been exposed to infected saliva and blood provide a significant source of such infectious agents [4].

Cross infection issue among prosthodontologist and dental lab technicians is very important issue, especially after several studies found that transmission of infection to dental lab technicians is mainly by contaminated impressions or by improper handling of clinical items after arrival at the Dental laboratory [5].

Disinfection of dental impressions is an essential routine that aims to protect dental personnel, who handle impressions or casts, against exposure to diseases brought by contact with microorganisms. Moreover, casts poured from infected impressions can carry microorganisms and that may spread to the other parts of the dental lab during trimming of the casts [6].

Dentist who should inform the dental lab technicians about the status of impression disinfection. It is a recommended practice for dentists to send a label indicating the status of impressions as "disinfected impressions" to the dental lab, this practice can eliminate possible uncertainty facing dental technicians when they receive the impressions and prevent repetitive disinfection which may affect the dimensional stability and the surface detail reproduction of the impressions [7, 8].

It has been reported that rinsing the impression with water solely does not remove contamination [10] However, as the chemical disinfection is a surface phenomenon, it is important that prior to the immersion of the impression in the disinfectant, the impressions surface should be wash to remove obvious debris so that contact with the disinfectant solution is maximized [11]. Therefore, disinfecting of the impression and further rinsing the disinfectant off is required. It is known that variety of chemical agents can be used efficiently for impression disinfection provided that each type is applied to the impression according to the manufacturer's instructions [9].

Distrust between dental technicians and dentists could result in repeating disinfection procedures of impressions by dental technicians even after being disinfected by dentists risking dimensional changes and alterations to the accuracy of the impression material. [12]

This study aimed to examine the knowledge and practice of infection control of dental impressions among dental technicians in Tripoli, Libya and the level of communication that currently exists between dentists and dental technicians.

METHODS

This study, conducted in august 2022, and distributed nationally to the owners of dental laboratories in Tripoli (Libya). The questionnaire was designed to cover different aspects of cross-infection control in the dental clinic, adapted from pretested questionnaire that has been applied in similar studies Almortadi et al., 2019 [11], The questionnaire consists of 10 closed end question and 3 yes, no question.

Prior to completing the questionnaire, it was piloted over sample (n=10) of the target group to ensure the clarity of the questions. Questionnaire distributed was carried out personally by the authors.

Data management and statistical analysis were performed using the statistical software SPSS version 20.0, percentages were obtained for categorical data.

RESULTS

Out of 100 questionnaire form sent eighty-five questionnaires were returned. The response rate was therefore 85%. Table 1 shows the characteristics of dental laboratories. About half of the directors and dental technicians were reportedly vaccinated against HBV. About (32.9%) of the dental technicians did not

have instructions related to disinfection in the dental lab.

The different practices of dental technicians upon receiving the impressions are summarized in Table 2. Upon receipt of dental impressions, the majority (80.5%) reported always rinsing them with water. Different practices for the disinfection of dental impressions were apparent. About 7.8% of the dental technicians reported never disinfecting dental impressions and about 33.8% reported that they sometimes disinfected impressions (Table 2). In the labs were the disinfection applied, 11.7% of the dental labs used spray disinfection (without water) and 11.7% of dental technicians used immersion disinfection (without water). About 2.6% reported not using gloves in their labs (Table 2).

Table 1. The characteristics of dental laboratories

Questions	Answers	Count	Percentage
HBV vaccination of dental technicians	Yes No	42 43	49% 51%
Do you have disinfection instructions at your lab?	Yes No	57 28	67.1% 32.9%

Table 2. The practices of dental technicians upon receiving the impressions

Questions	Answers	Count	Percentage
Do you wash the dental impression?	Always Sometimes Never	69 14 2	80.5% 16.9% 2.6%
Do you disinfect the dental impression?	Always Sometimes Never	49 29 7	58% 33.8% 7.8%
What is the type of disinfectant to be used in disinfection of dental impression?	Alcohol. Chlorine combination. Phenols. I don't know	41 21 4 19	47.5% 25% 5% 22.5%
How do you disinfect?	Spray only Immerse only Spray and immerse Water then spray Water then immerse I don't know	10 10 21 17 17 10	11.7% 11.7% 24.7% 20% 20% 11.7%
Do you wear gloves?	Always Sometime Never	61 22 2	71.8% 25.9% 2.6%

Table 3, shows the disinfection status in which dental technicians received the impressions from the dentists. Although there is no recommendation on how dentists should send impressions to the lab. In this investigation, the majority 67.5% reported that they received the impressions in special sealed bags and wrapped in wet tissue. Most of the dental technicians (83.5%) reported that they did not know the type of disinfection used by the dentists. However, the majority of the dental technicians believed that the dental assistant (55.2%) or the dentist (24.7%) should disinfect the impressions before shipping them to the labs.

Table 3 The disinfection status in which dental technicians received the impressions from the dentists

Questions	Answers	Count	Percentage
How do you receive dental the impressions?	In a specific bag In bag and wet wrapped In any bag Unwrapped. Without a bag, only wet wrapped.	26 57 1 1	30.5 % 67 % 1.17% 1.17%
Do you receive a note about disinfection?	Most of the time. Sometimes. Not at all.	23 29 33	27% 34.1% 38.8%
Do you give any notes about how to receive the dental impression?	Yes. No.	47 38	55.3% 44.7%
Do you know what the type of disinfectant used by the dentist is?	Yes No	14 71	16.4% 83.5%
When do you disinfect the dental impression upon receipt?	Within 5 min Within10 min Within30 min I don't know	36 17 4 28	42.4% 20% 4.7% 32.9%
Who should do the disinfection?	The dentist The dental assistant The dental technician	21 47 17	24.7% 55.2% 20%

DISCUSSION

Dentists and dental laboratories are exposed to different types of pathogenic microorganisms. Impression materials, impression trays and poured stone cast have been said to be the main source of cross infection. [13].

This study shows that a considerable number of dental technicians always disinfect the dental impressions (58%) upon receipt regardless of whether they have been disinfected by the dentists. This approach follows the recommendations by Lepe and coworkers [14] who investigated the practices of workers in commercial dental laboratories in the UK, it is surprising that while some dental technicians reported washing the received impressions, others did not with some even thinking that washing the impression -with or without soap is an acceptable disinfection practice.

It is clear that there was a wide variation in the chemical disinfectant solutions used by the dental technicians in this study. However, some of the chemicals that used were recommended for dental uses but others were not, this indicates confusion among dental technicians regarding disinfection and suggests that education in this area is required. Selection of the correct type of disinfectant for impressions is also very important as inappropriately selected disinfectants can induce changes in both the accuracy and details of impression [15].

This study also shows that a considerable number of dental technicians always wear of a gloves, with (71.8%) stating that they had used gloves. This finding, however, demonstrates a progress in this area when compared to the findings of a previous survey of dental technicians in Jordan, [16] where only 12% of respondents reported wearing gloves when receiving dental impressions from various dental clinics.

This study highlighted the poor communication between dentists and dental technicians. In contrast, a study conducted in Saudi Arabia revealed that 60.87% of dental technicians knew that the impressions received from dental clinics were disinfected, and 56.25% of the dentists informed their laboratory technicians about the disinfection status. Therefore, it is recommended that dentists attach labels to impressions sent to dental labs indicating the disinfection status of the impressions. Since repetitive disinfection of impressions poses risk of changes in dimensional stability and surface detail reproduction, communication between dentists and dental technicians in this regards is essential.

A further area for improvement suggested by this study is in the selection and application of disinfectant. Some dental technicians did not recognize the type of disinfectant that used in the disinfecting of the dental impressions. Although many dental labs mentioned commercial names of disinfectants bought out off the shelf for surface disinfection, these disinfectants were not suitable for use with impression materials, and in all cases, they could influence the accuracy of impressions.

This study finding that a significant percentage of dental technicians have not been reportedly vaccinated, suggests that vaccination against HB virus should also be reinforced, this approach follows a study conducted in Jordan revealed that 49.4% of dental technicians had been vaccinated and 50.6% of dental technicians had no vaccination [11].

CONCLUSION

The findings of this study show that practices and awareness of dental technicians regarding infection control are less than ideal, and this might increase the risk of transmission of diseases. Moreover, there is lack of communication between dentists and dental technicians so should increase awareness and establishing educational programs for both dentists and dental technicians to decrease the risk of transmission of diseases in dental laboratories.

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